



SPACE LAUNCH SYSTEM

NOVEMBER 2017

**BOOSTER
NOZZLES
COMPLETE**

NOZZLE ASSEMBLIES TO BE MATED AT KENNEDY

SLS solid rocket boosters prime contractor Orbital ATK recently completed the booster nozzles for Exploration Mission-1 (EM-1), the first flight of SLS and the Orion spacecraft. Finishing touches on two aft exit cones include photogrammetric markings that will help engineers assess clearances between the boosters and ground structures during the initial moments after liftoff. At Kennedy Space Center in Florida during the integration phase of the program, the aft exit cones will be mated with the rest of the nozzle assemblies, which are also complete. During spaceflight, the booster nozzles direct the expanding gases from the burning solid propellant downward, helping the heavy-lift vehicle escape Earth's gravity and send Orion to lunar orbit. The powerhouse SLS five-segment solid rocket boosters are the largest ever built for flight and will provide more than 75 percent of the thrust during the first two minutes of spaceflight.

Read the full story: bit.ly/2BGXavf



FLIPPING FOR FLIGHT HARDWARE AT MARSHALL

The EM-1 Orion stage adapter, which joins the interim cryogenic propulsion stage to the Orion spacecraft, is nearly finished. In November, engineers installed mounting brackets to hold the 13 CubeSat secondary payload dispensers and one avionics unit. After fitting the brackets, technicians flipped the adapter and installed the diaphragm. The final steps before shipping the adapter to Kennedy Space Center include installing the avionics unit, connecting cables and performing electrical tests, and mounting a hazardous gas detection tube.

The [13 CubeSat 6U payloads](#) are each the size of a large shoebox and weigh about 30 pounds or 14 kg. They will hitch a ride to deep space safely stowed in the Orion stage adapter and will include NASA research experiments and spacecraft developed by industry, international, and academic partners. The CubeSats will be deployed after Orion separates from the Space Launch System.

The Orion stage adapter diaphragm, manufactured by Janicki Industries in Hamilton, Washington, provides a barrier to prevent launch vehicle gases — such as hydrogen — from entering the Orion spacecraft, where astronauts will ride to lunar orbit. The diaphragm is constructed of multiple layers of carbon-fiber fabric infused with epoxy. The Orion stage adapter measures 18 feet in diameter and 5 feet tall.





JAXA PAYLOAD REPS VISIT MARSHALL

SLS hosted safety reviews this week for two EM-1 CubeSat secondary payloads from Japanese Aerospace Exploration Agency (JAXA), EQUilibriUm Lunar-Earth point 6U Spacecraft (EQUULEUS) and Outstanding MOon exploration TEchnologies demonstrated by NAno Semi-Hard Impactor (OMOTENASHI). JAXA bills OMOTENASHI as “the world’s smallest lunar lander,” and EQUULEUS will help scientists better understand the radiation environment in the region of space around Earth. After the safety review meetings, the team got to visit the EM-1 Orion stage adapter (OSA) and see brackets with which their payloads will be mounted when they fly in two years.

HYDROGEN TANK, CORE STAGE PATHFINDER MEET AT MICHLOUD BEFORE PRESSURE TEST

A SLS liquid hydrogen flight tank passed the core stage pathfinder on the tank's way to a pressure test facility at Michoud Assembly Facility on November 10. This pneumatic proof test involves pressurizing the tank with nitrogen gas, attaching hydraulic struts, and imparting loads to simulate structural stresses it will see in flight. Bubble soap is sprayed on the tank while under pressure to help technicians look for leaks. After proof testing, the tank will be X-rayed in another building. The pathfinder is at Michoud to be used in various lifting and moving exercises and will also travel to Stennis Space Center and Kennedy Space Center.



TECHNICIANS PRACTICE LIFTING AND MOVING THE SLS ENGINE PATHFINDER

Technicians practiced operations with the RS-25 pathfinder engine which recently arrived at NASA's Michoud Assembly Facility in New Orleans in November.

Read the full story: bit.ly/2Bejonu



ON THE ROAD WITH SLS

WILDWOOD ELECTRONICS



SLS representatives honored Wildwood Electronics November 13 in Madison, Alabama. Wildwood Electronics has contributed to America's human spaceflight programs since soon after its founding in 1983. Boeing's Space Launch System Program Director John Shannon (right), retired shuttle astronaut Col. Patrick G. Forrester (second from right), NASA SLS Deputy Manager Jerry Cook (third from right), and Wildwood President Becky Owens (second from left) spoke to visitors and 45 Wildwood employees at the small business.



Wildwood President Becky Owens spoke of her company's history as a supplier to Boeing, a NASA SLS prime contractor. Wildwood manufactures electronics for space flight, including SLS.

WHAT'S NEW IN SLS SOCIAL MEDIA



On November 6, NASA's Marshall Center YouTube channel posted this animated video depicting NASA's Space Launch System, the world's most powerful rocket for a new era of human exploration beyond Earth's orbit. The 1 minute and 26-second video has attracted more than 81,000 views since it debuted.

Watch it here: bit.ly/2AwjZBm

SPACEFLIGHT PARTNERS: *Fort Walton Machining, Inc.*

NUMBER OF EMPLOYEES: 180

LOCATION: Fort Walton Beach, Florida

WHAT THEY DO FOR SLS: Fort Walton Machining is a design/specification intense build-to-print manufacturer that is machining and assembling complex precision floor plates for support of the SLS solid rocket boosters.



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COMING UP

SLS year-end review